

# APPLICATION NOTE

MX158070A

Jitter measurement application software

MX158071A

Jitter measurement sequence driver

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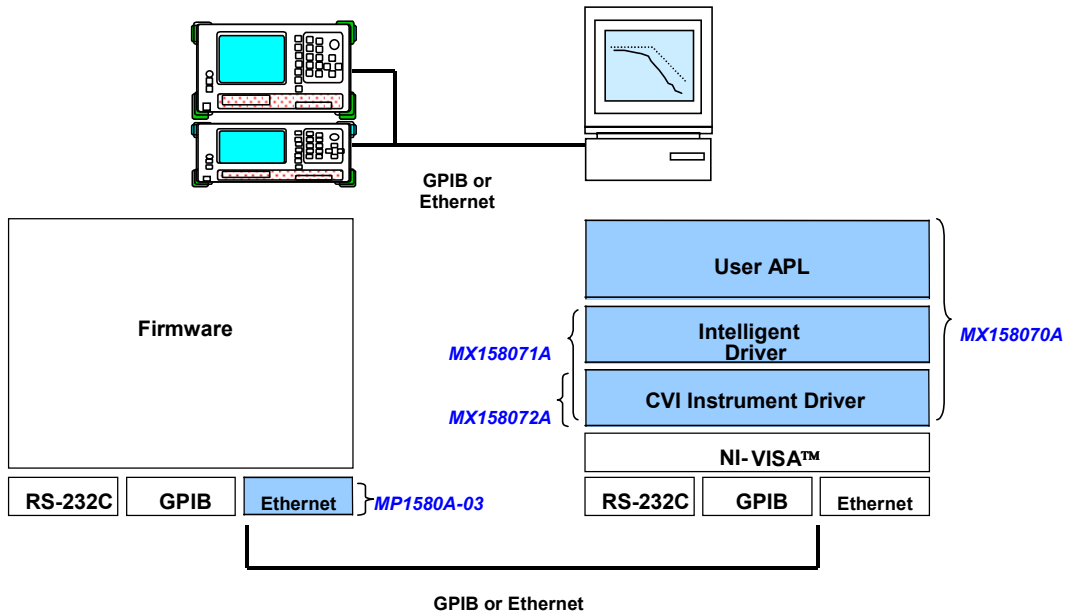
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# 1. Outline

Model name	Product name
MX158070A	Jitter measurement application software
MX158071A	Jitter measurement sequence driver
MX158072A	Lab windows CVI driver for MP1580A

The MX158070A Jitter Measurement Application Software is used to control the MP1580A 2.5G/10G Analyzer and MP1570A/A1 SONET/SDH/PDH/ATM Analyzer to perform various jitter measurements. The software runs on an external PC and controls the units via the GPIB or Ethernet interfaces. This application software is based on Anritsu's CVI Instrument Driver and Intelligent Driver software drivers. However, when the customer wants to create a customized measurement system (application software), it is best to use just the MX158071A driver (Jitter measurement Sequence Driver) or MX158072A (\*LabWindows/CVI Driver for MP1580A).

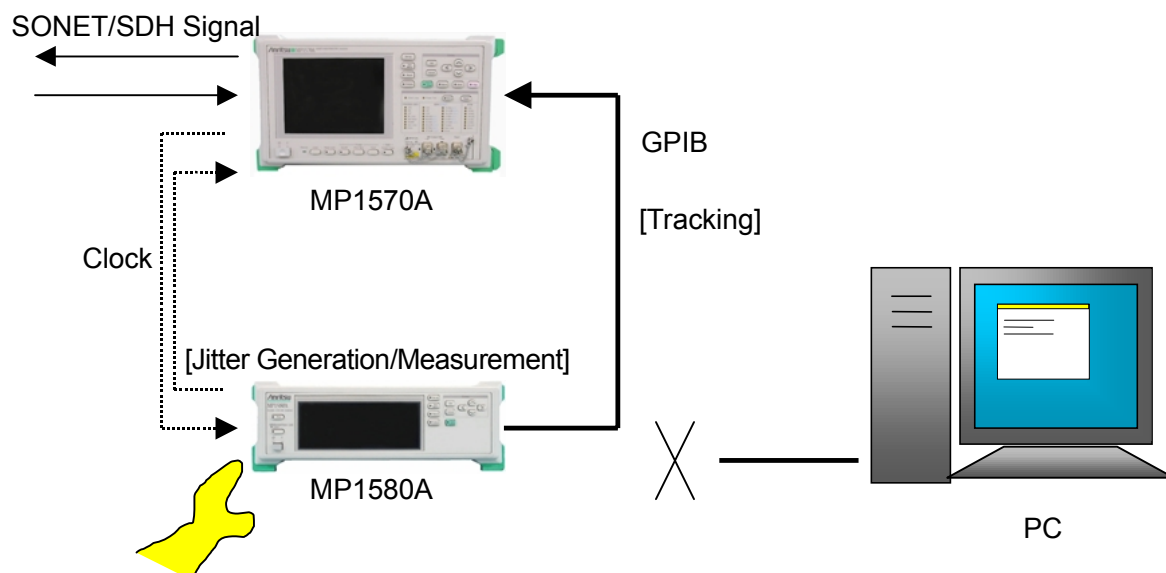
\*The MX158072A is bundled with the MP1580A as a standard accessory



## 2. MX158070A *Jitter Measurement Application Software*

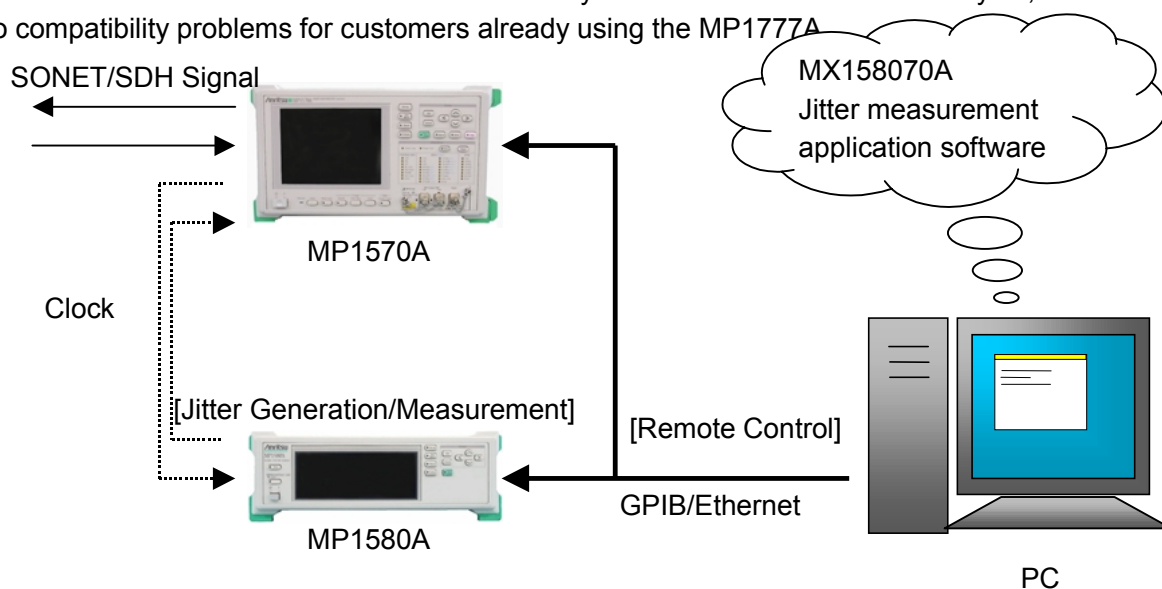
The MX158070A Jitter Application Measurement Software performs measurement of various types of 2.5/10G jitter by remote control of the MP1580A Portable 2.5G/10G Analyzer and the MP1570A SONET/SDH/PDH/ATM Analyzer.

Since the MP1580A cannot generate SONET/SDH signals, the MP1570A is required for the measurement of jitter in SONET/SDH signals. The MP1580A controls (tracking) the MP1570A via the GPIB interface and is then able to perform various jitter measurements.



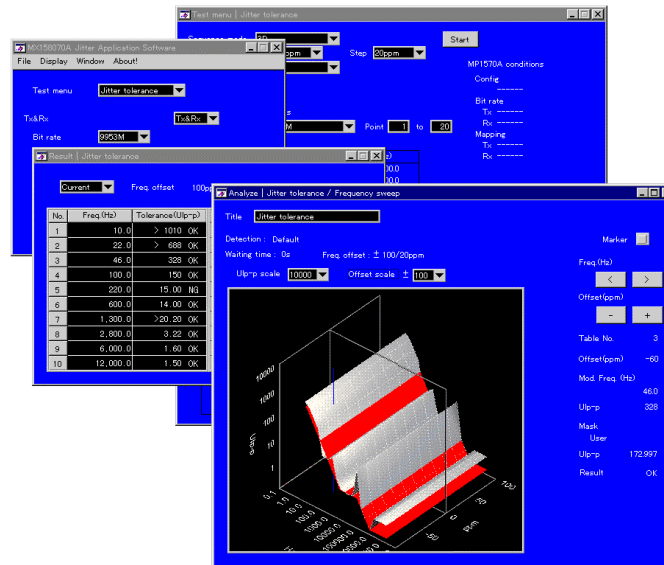
Since control of the MP1570A uses the GPIB interface and requires complex control between the measuring instruments, remote control of jitter measurement by is actually quite difficult.

The use of a PC simplifies matters by allowing the MX158070A Jitter Measurement Application Software to remotely control the MP1570A and MP1580A simultaneously. Moreover, since it inherits the easy operability of the MX177701A Jitter Performance Test Software used by the MP1777A 10G Jitter Analyzer, unfortunately there are no compatibility problems for customers already using the MP1777A.



**Jitter Measurement Example (remote control)**

Furthermore, this software is the first to support 3D display of measurement result graphs(\*1).



**MX158070A Jitter Measurement Application Software Screen**

The main features and restrictions of the MX158070A Jitter Measurement Application Software are listed below.

— Main Features —

- Supported Jitter Measurements
  - Manual
  - Jitter tolerance
  - Jitter sweep
  - Frequency sweep
  - Jitter transfer
  - Wander sweep
- 3D Graphical display of jitter tolerance results including offset frequency(\*1)
- Saving/Reading measurement results and conditions to/from data file
- Printing measurement data and screens
- Remote control via GPIB/Ethernet
- Support for Windows®95/98/Me/2000 Windows NT®

— Restrictions —

- Operating Environment
  - PC: IBM-PC/AT or compatible
  - CPU: Pentium® 200 MHz min.
  - Memory: 64 MB min.
  - OS: Windows®95/98/Me/2000 Windows NT® (English or Japanese version)
  - Display: 800 × 600 pixels or more, 256 colors or more
  - HDD: >50 MB of free space
  - Others: CD-ROM drive
  - GPIB: National Instruments™ PCI-GPIB, PCMCIA-GPIB, AT-GPIB/TNT
  - LAN: IBM-PC/AT or compatible LAN board
  - NI-VISA™ Ver. 2.5 or later (\*2)
- Controlled Instruments
  - Jitter Analyzer: MP1580A (Ver. 1.02 or later) (\*3)
  - SONET/SDH Analyzer: MP1570A (Ver. 3.00 or later) (\*3)

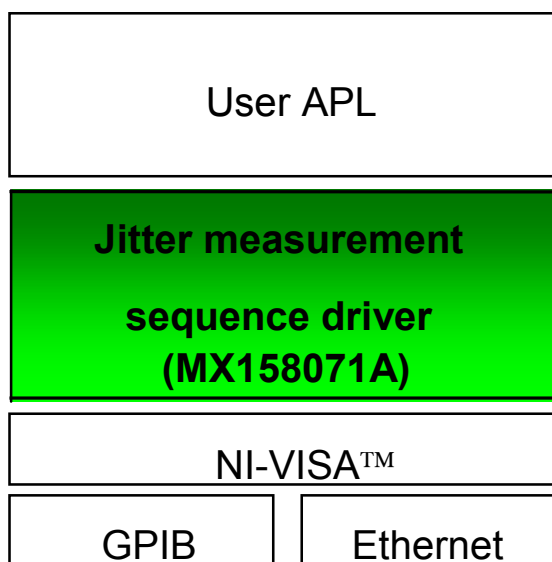
### 3. MX158071A *Jitter Measurement Sequence Driver*

The MX158071A Jitter Measurement Sequence Driver software performs various 2.5/10G jitter measurements by remotely controlling the MP1580A Portable 2.5G/10G Analyzer and the MP1570A SONET/SDH/PDH/ATM Analyzer. Using this software eliminates the need to understand complex control of measuring instruments, permitting users to easily create their own application programs.

The MX158070A (Jitter Measurement Application Software) offers customers general functions for measuring jitter. Customers with special requirements, however, may have to create their own measurement system (application software). For example, if the customer wants to change the printing format or perform automatic testing including non-jitter measurements or create a link to a jitter measurement database.

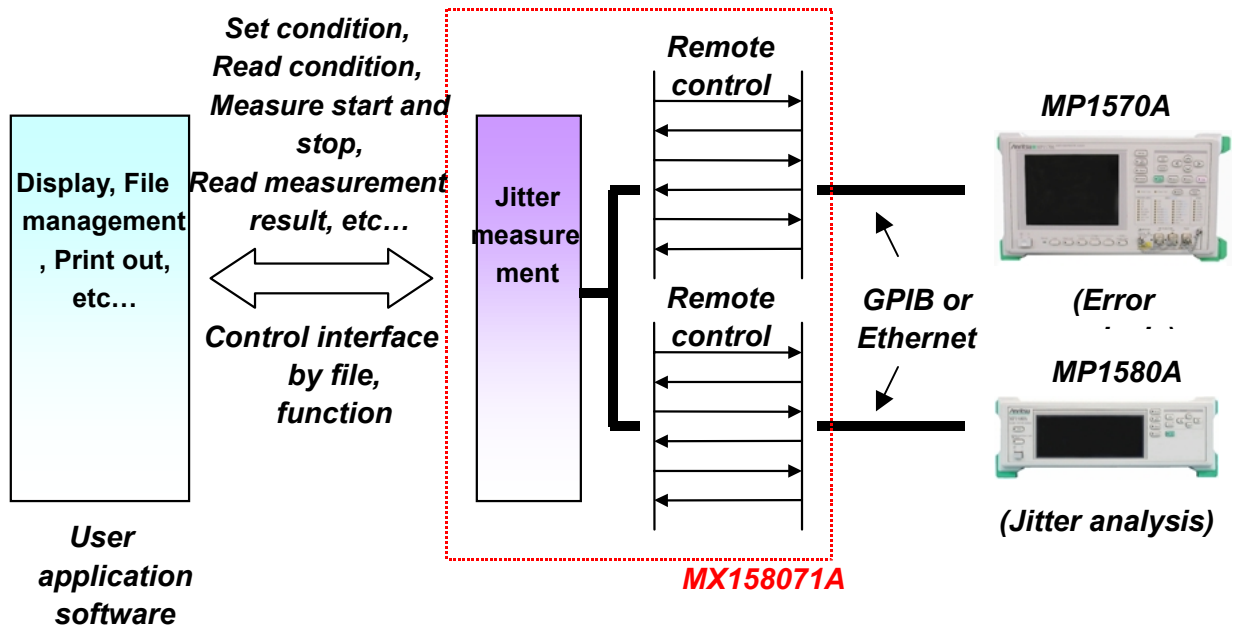
However, the part of the software related to control of measuring instruments requires good knowledge of the measuring instrument, which can make the programming quite difficult. The MX158071A Jitter Measurement Sequence Driver offers the customer an easier programming environment by eliminating the need to understand complex control of measuring instruments.

The MX158071A Jitter Measurement Sequence Driver is based on the National Instruments™ - Virtual Instrumentation Software Architecture (NI-VISA™), which supports different remote interfaces such as GPIB, Ethernet, serial, etc. (\*2).



**Block Diagram of Jitter Measurement Sequence Driver**

This driver is in the form of a DLL (Dynamic Link Library) and the user application part (part created by the user) accesses the driver using functions and a file interface. This driver offers the user application an interface for reading, setting changes and setting status, starting/stopping measurement, reading measurement results, etc. This driver performs direct control of the measuring instruments to perform jitter error measurement. There is no need for the user to have any knowledge of remote commands for the measuring instruments. Consequently, the user application part deals with programming for the man-machine interface such as screen display, file operations, printing, etc.



**Function Block Diagram of Jitter Measurement Sequence Driver**

The main features and restrictions of the MX158071A Jitter Measurement Sequence Driver are listed below.

— Main Features —

- Supported jitter measurements
  - Manual)
  - Jitter tolerance
  - Jitter sweep
  - Frequency sweep
  - Jitter transfer
  - Wander sweep
  - Support for Measurement Studio™ (LabWindows™/CVI)
- Control interface (DLL) using functions and files
- Remote control via GPIB/Ethernet
- Support for Windows®95/98/Me/2000 Windows NT®

— Restrictions —

- Operating Environment
 

PC:	IBM-PC/AT or compatible
CPU:	Pentium® 200 MHz min.
Memory:	64 MB min.
OS:	Windows®95/98/Me/2000 Windows NT® (English or Japanese version)
HDD:	>50 MB of free space
Display:	800 × 600 pixels or more, 256 colors or more
Other:	CD-ROM drive
	GPIB: National Instruments™ PCI-GPIB, PCMCIA-GPIB, AT-GPIB/TNT
	LAN: IBM-PC/AT or compatible LAN board
	Measurement Studio™ (LabWindows™/CVI) Ver. 1.0.1 or later (Supplementary *4)
	NI-VISA™ Ver. 2.5 or later (*2)
- Controlled Instruments
 

Jitter Analyzer:	MP1580A (Ver. 1.02 or later) (*3)
Error Analyzer:	MP1570A (Ver. 3.00 or later) (*3)



## 4. MX158072A *LabWindows CVI Driver for MP1580A*

The MX158072A LabWindows CVI Driver for MP1580A software is a driver for performing remote control of the MP1580A Portable 2.5G/10G Analyzer.

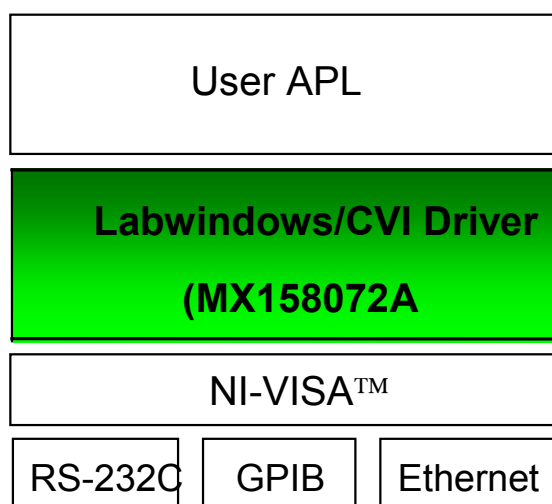
Using this software makes it possible to easily configure an automatic measurement system.

The MP1580A has remote commands for various measuring instruments. Normally, when the user is configuring a measurement system, it is necessary to perform programming by referencing the manual for the required remote commands. However, by using the LabWindows™/CVI driver the time required for programming is greatly shortened because the effort of searching for commands in the manual is eliminated. Furthermore, in this driver, remote commands are converted to functions so the user can perform programming with no knowledge of remote commands.

The MX158072A LabWindows/CVI Driver is based on the National Instruments™ - Virtual Instrumentation Software Architecture (NI-VISA™), which supports different remote interfaces such as GPIB, Ethernet, serial, etc. (\*2).

(\*2)

This simplifies programming related to connecting measuring instruments to difference interfaces.



**LabWindows/CVI Driver Software Block Diagram**

At programming, the customer themselves must input the driver functions directly into the source code but if they use the LabWindows™/CVI function input tool (fp file) a graphical image of the function could be obtained, which simplifies input to the source code

The driver fp file is a collection of the pre-measurement setup and customer measurement-related functions that facilitates easy input to the source code.

In addition, the help built into the function panel (fp file) explains the functions, remote commands and input examples, so even customers who are configuring a system using LabWindows™ for the first time are able to perform programming easily by using this driver.

Select fp panel

<Source code for application>

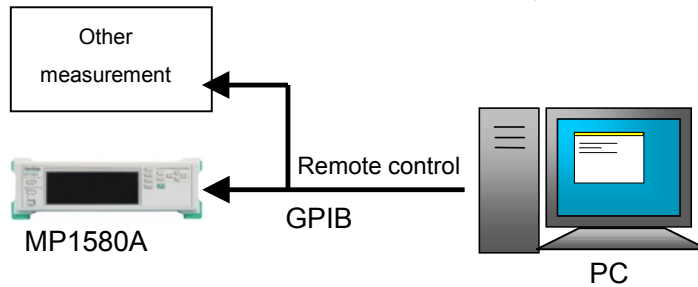
Insert to source

<Select function panel window>

<fp panel>

### Programming Example using fp

This driver can be used to configure a measurement system in combination with other measuring instruments using LabWindows™/CVI drivers. If there is a LabWindows™/CVI driver for a customer's measuring instrument, it can be combined with the MP1580A in a measurement system.



### Remote Control Configuration Example

The MX158072A LabWindows/CVI driver for MP1580A is bundled as a standard accessory with the main unit.

[Note]

It is not bundled with MP1580A versions earlier than 1.02.

\*Customers requiring this driver should contact their local Anritsu sales representative.

— Restrictions —

○ Operating Environment

- PC: IBM-PC/AT or compatible
- CPU: Pentium 200® MHz min.
- Memory: 64 MB min.
- OS: Windows®95/98/Me/2000 Windows NT® (English or Japanese version)
- Other: CD-ROM drive
- GPIB: National Instruments™ PCI-GPIB, PCMCIA-GPIB, AT-GPIB/TNT
- LAN: IBM-PC/AT or compatible LAN board
- Measurement Studio™ (LabWindows™/CVI) Ver. 1.0.1 or later (Supplementary \*4)
- NI-VISA™ Ver. 2.5 or later (\*2)

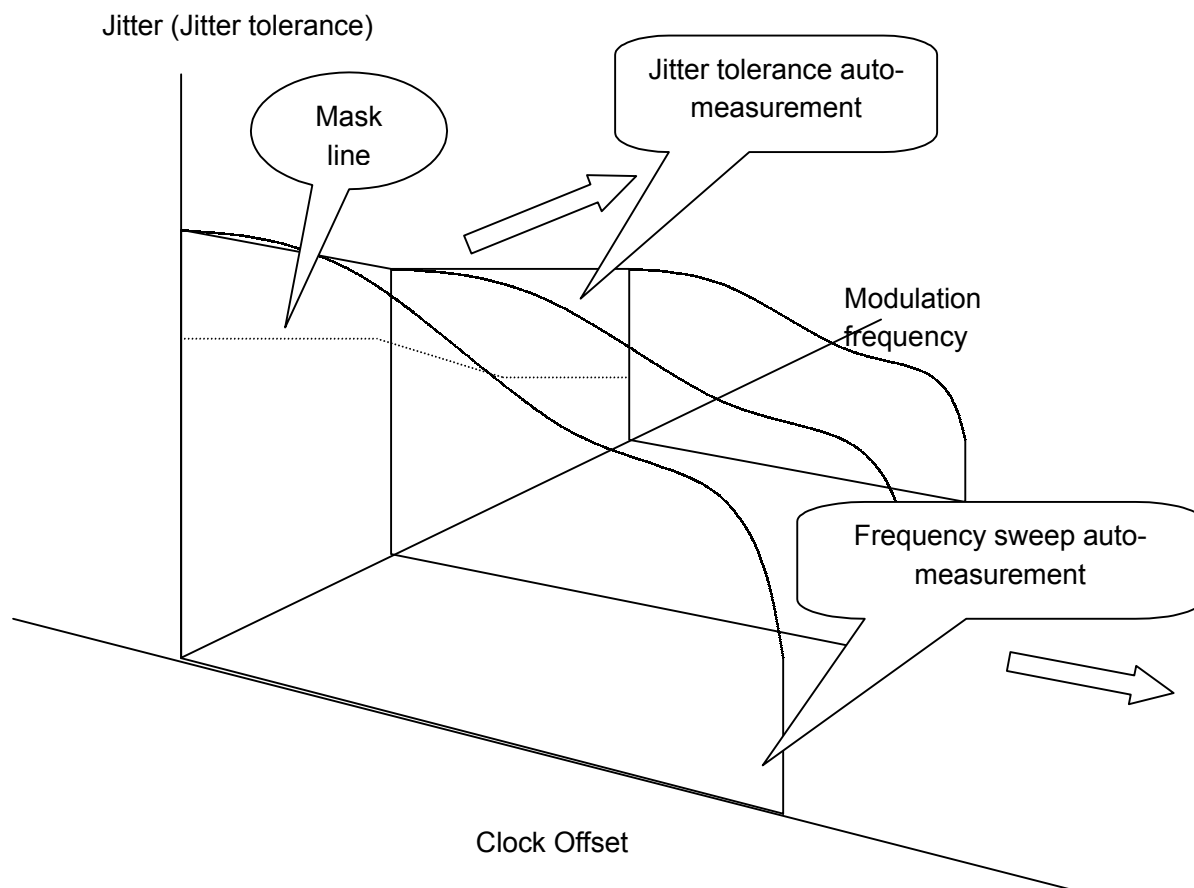
○ Controlled Instruments

- Jitter Analyzer: MP1580A (Ver. 1.02 or later) (\*3)

## 5. Supplementary

### (\*1) 3D Display of Jitter Tolerance

For jitter tolerance measurement, it is necessary to find the lowest tolerance point when the main signal clock offset and modulation frequency are changed. In other words, a 3D view is fundamentally required. The MP1580A provides a 2D view for jitter tolerance and frequency sweep measurements, but when the MX158070A Jitter Measurement Application Software is used, the measurement results can be displayed in 3D.



**Jitter Tolerance Measurement Including Offset Frequency**

### (\*2) NI-VISA™

To use the MX158070A Jitter Measurement Application Software, the MX158071A Jitter Measurement Sequence Driver, and the MX158072A LabWindows™/CVI Driver for MP1580A, the National Instruments™ software driver called NI-VISA™ (National Instruments™ - Virtual Instrumentation Software Architecture) is required. It is a software driver offering simultaneous support for different remote interfaces such as GPIB, Ethernet, serial, etc. It is bundled as a standard accessory with the National Instruments GPIB board. Customers using only the Ethernet interface can download it free of charge from the National Instruments home page. (The URL address is on the CD-ROM case label.)

Note that NI-VISA™ Ver. 2.5 or later is required.

### **(\*3) MP1570A and MP1580A Firmware Revisions**

The following MP1580A and MP1570A firmware versions are required to use the MX158070A Jitter Measurement Application Software and MX158071A Jitter Sequence Driver.

MP1580A:	Ver. 1.02 or later
MP1570A:	Ver. 3.00 or later

### **(\*4) Measurement Studio™ (LabWindows™/CVI)**

Version 1.0.1 of the Measurement Studio (LabWindows™/CVI) programming environment is required to use the MX158071A Jitter Measurement Sequence Driver and MX158072A LabWindows™/CVI Driver for MP1580A.

Measurement Studio (LabWindows™/CVI) is provided by National Instruments™ as a programming environment for developing measurement applications in C. There are other programming environments in addition to Measurement Studio™ (LabWindows™/CVI), such as LabVIEW™, Visual C++®, Visual Basic®, Delphi™, Borland® C++, HPVVEE, but most industrial software engineers use C and National Instruments™ is a well-respected company in the field of measuring instrument control.

Measurement Studio™ (LabWindows™/CVI) is used as the MP1580A remote control development platform for these reasons and also because it has an affinity with other programming environments (provides easy LabVIEW™, Visual C++®, Visual Basic® portability).

\* The MX158071A Jitter Measurement Sequence Driver and MX158072A LabWindows™/CVI Driver for MP1580A only support Measurement Studio™ (LabWindows™/CVI).

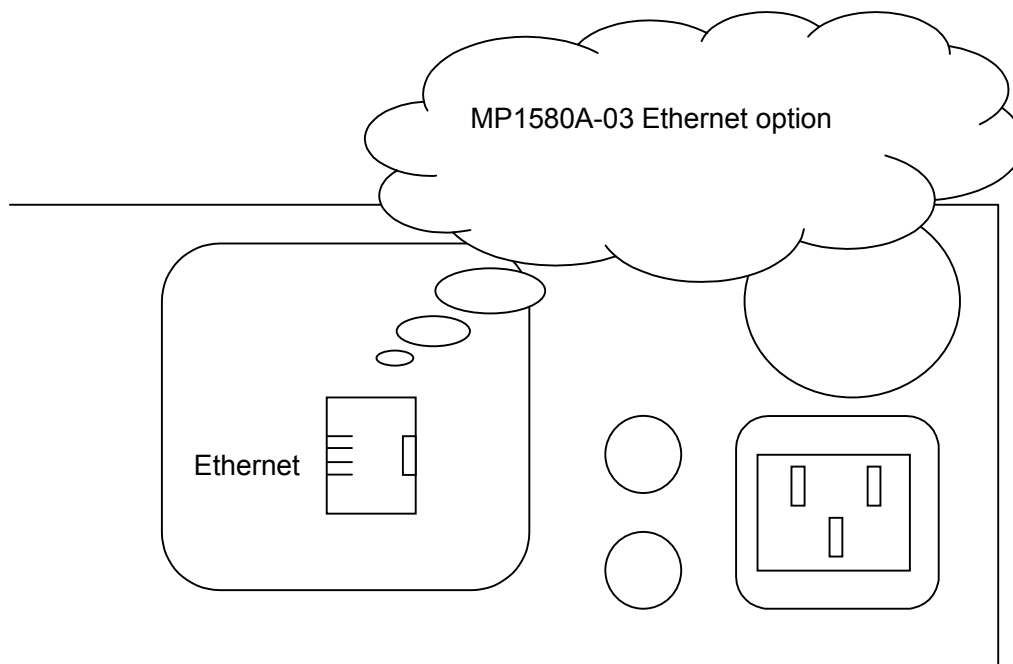
## (\*5) MP1580A Option03 (Ethernet)

The MP1580A-03 Ethernet option offers remote control of the MP1580A Portable 2.5G/10G Analyzer via Ethernet (TCP/IP).

As more PCs are now be shipped with built-in LAN, this option permits connection to a PC without the need to install an expansion board such as GPIB in the PC.

In addition, this option has 10/100M auto-switching, permitting connection beyond routers by setting gateways and allowing configuration of a true LAN environment.

Remote control of an MP1580A using an Ethernet (TCP/IP) interface requires use of socket communications technology. The MP1580A acts as the server while the PC is the client. When the MX158071A Jitter Measurement Sequence Driver or the MX158072A LabWindows™/CVI Driver for MP1580A is used, the user does need any knowledge of sockets.



**MP1580A Back Panel**

The main features and restrictions of the MP1580A-03 Ethernet option are shown below.

— Main Features —

- 10M/100M LAN auto-switching
- Ethernet (TCP/IP)
- For remote control (SCPI command)

— Restrictions —

- The number of ports is fixed at 15,800.

This option requires MP1580A firmware version 1.03 or later. The hardware (LAN board) must be installed when installing the software. In the future, the hardware will be installed as standard whether or not the option is required.



Specifications are subject to change without notice.

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